

- Today, people cannot escape the neighboring or ambient radiofrequency radiation entering their own living, working and educational spaces even if they do not use wireless themselves. People of all ages and backgrounds are experiencing the damaging results of oxidative stress from 24/7 wireless fields – as per the science – whether they know it or not. Multiple body systems are affected, and **effects are not minor or fleeting, but life-altering, making the difference between being a disabled person in chronic pain and/or disease and a functioning healthy individual.**
- The two scientific studies uploaded paint a picture of what FCC is allowing to happen to the population by failing to limit wireless exposures. The FCC must respond to current science that point to life-altering non-thermal harm from wireless radiation by lowering RF exposure limits for everyone, cautioning populations especially vulnerable to oxidative damage revealed in these and other studies, halting 5G roll-outs and promoting the use of fiber optic connections to premises, along with wired/fiber connection ports inside public buildings, schools, businesses and homes.

Here are quotes from the attached studies, revealing oxidative stress damage, in general (2008), and EMF caused oxidative stress damage (2021).

1. “Free Radicals, Antioxidants in Disease and Health” 2008

“(oxidative stress) can induce a variety of chronic and degenerative diseases as well as the aging process and some acute pathologies (trauma, stroke)...”

“...(oxidative stress) plays a major part in the development of chronic and degenerative illness such as cancer, autoimmune disorders, aging, cataract, rheumatoid arthritis, cardiovascular and neurodegenerative diseases.”

“It is well established that oxidative DNA damage is responsible for cancer development.”

“...research data has raised a passionate debate as to whether oxidative stress is a primary or secondary cause of many cardiovascular diseases.”

“Oxidative stress plays a role in a variety of renal diseases .”

“Oxidative stress is also cited as a factor in ocular disease, rheumatoid arthritis, pulmonary disease, neurological diseases, and fetal damage.”

2. “Manmade Electromagnetic Fields and Oxidative Stress—Biological Effects and Consequences for Health”

[David Schuermann](#)^{1,*} and [Meike Mevissen](#)^{2,*}

Maria Luisa Balestrieri, Academic Editor

“...provide consistent evidence for oxidative stress in the liver and kidneys.

Conclusions

“The majority of recent animal studies on increased ROS production and oxidative stress caused by EMF were aimed at investigations of the nervous system and reproduction.

Analogously, in cell studies, neurons or neuron-like cells were most frequently used. Animal studies on oxidative stress and possible impairment of reproduction at different stages (sperm maturation, very early stages of pregnancy such as implantation, and effects in newborns and after a few weeks of EMF exposure to the mother animals during pregnancy) follow in second place. These animal studies were supported by some cell studies, mainly in mouse cell lines of the male reproductive system and in sperm. Overall, more cells than animal studies were published, using, in addition to the abovementioned cell types of the nervous and reproductive system, immune and cancer cells, as well as isolated cells from the skin and epithelia. For this report, animal and cell studies were included, according to their quality and research question, in order to give an informative overview of the available studies; however, this is not a systematic review.

In summary, indications for increased oxidative stress caused by RF-EMF and ELF-MF were reported in the majority of the animal studies and in more than half of the cell studies. Investigations in Wistar and Sprague-Dawley rats provided consistent evidence for oxidative stress occurring after RF-EMF exposure in the **brain and testes** and some indication of oxidative stress in **the heart**. Observations in Sprague-Dawley rats also seem to provide consistent evidence for oxidative stress in **the liver and kidneys**. In mice, oxidative

stress induced by RF-EMF was predominantly demonstrated in **the brain and testes, as well as in liver, kidneys, and ovaries.** These observations were made with a variety of cell types, exposure times, and dosages (SAR or field strengths), within the range of the regulatory limits and recommendations. Certainly, some studies were subject to methodological uncertainties or weaknesses or are not very comprehensive regarding exposure time, dose, number, and quantitative analysis of the biomarkers used, to name a few. **A trend is emerging, which becomes clear even when taking these methodological weaknesses into account, i.e., that EMF exposure, even in the low dose range, may well lead to changes in cellular oxidative balance.**

Organisms and cells are able to react to oxidative stress, and many observations after EMF exposure point to an adaptation after a recovery phase. **Adverse conditions, such as diseases (diabetes, neurodegenerative diseases), compromise the body's defense mechanisms, including antioxidant protection mechanisms, and individuals with such pre-existing conditions are more likely to experience health effects.** The studies show that **very young or old individuals can react less efficiently to oxidative stress...**"